

CLAIMS

1. A *Lactobacillus fermentum* variant having the following characteristics:
 - (a) it is a Gram positive, facultative rod,
 - (b) it ferments ribose, galactose, glucose, fructose, mannose, maltose, lactose, melibiose, sucrose, trehalose, raffinose, L-arabinose and mannitol,
 - (c) it survives at pH 1.5 for up to 4 hours with a loss in growth of no more than log 3,
 - (d) it propagates in the presence of 0.5% bile salts at 37 C resulting in an increase in optical density of 0.5 to 0.8,
 - (e) it is stable when stored in gelatin capsules at 25 C,
 - (f) it adheres to Peyer's Patches at greater than log 5 cfu per mg tissue inhibiting pathogens both by a direct antagonistic effect and by triggering an immune modulation;or a component thereof.
2. A *Lactobacillus fermentum* variant according to claim 1, wherein said variant is VRI 003 (accession no. NM02/31074).
3. A component of a *Lactobacillus fermentum* variant according to claim 1, wherein said component is a cell fragment, extract, secretion or purified component.
4. A composition comprising a *Lactobacillus fermentum* variant according to claims 1 or 2, or a component of a *Lactobacillus fermentum* variant according to claim 1 or 3 and a pharmaceutically acceptable carrier.
5. A composition according to claim 4, further comprising a prebiotic, a non-digestible dietary component, dietary fibre or a pharmaceutically active compound.
6. A composition according to claim 5, wherein the prebiotic is inulin, a resistant starch, an oligosaccharide, a gum or a beta-glucan.
7. A composition according to claim 6, wherein said prebiotic is unmodified high amylose starch or beta-glucan.
8. A composition according to any one of claims 4 to 7, wherein said composition comprises live cells of the *Lactobacillus fermentum* variant.

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9. A composition according to any one of claims 4 to 7, wherein said composition comprises dead cells of the *Lactobacillus fermentum* variant.
10. A composition according to any one of claims 4 to 9, in the form of a tablet, capsule, powder, paste, gel, liquid formulation, dietary supplement or food product.
11. A composition according to claim 10, wherein said composition is in the form of a tablet.
12. A composition according to claim 10, wherein said composition is in the form of a food product.
13. A composition according to claim 12, wherein said food product is a dairy or dairy-based food product.
14. A composition according to claim 10, wherein said composition is in the form of a liquid formulation.
15. A composition according to claim 10, wherein said composition is in the form of a dietary supplement.
16. A method for preventing and/or treating a gastrointestinal disorder or symptoms thereof, comprising the step of administering a *Lactobacillus fermentum* variant according to claim 1 or 2, a component of a *Lactobacillus fermentum* variant according to claim 1 or 3, or a composition according to any one of claims 4 to 15, to a subject in need of such treatment.
17. A method according to claim 16, wherein said composition is administered orally.
18. A method according to claim 16 or 17, wherein said gastrointestinal disorder is irritable bowel syndrome, inflammatory bowel disease, diarrhoea, bloating, flatulence, abdominal cramping, abdominal pain, constipation or Crohn's disease.
19. A method according to any one of claims 16 to 18, wherein said gastrointestinal disorder is caused by a pathogen.
20. A method according to claim 19, wherein said gastrointestinal disorder is caused by a bacterium, virus or protozoa.
21. A method according to claim 20, wherein said bacterium is *Salmonella*, *Escherichia coli*, *Helicobacter*, *Vibrio* or *Pseudomonas*.
22. A method according to claim 20, wherein said virus is a Norwalks or rotavirus.

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23. A method according to claim 20, wherein said protozoa is *Cryptosporidium*, *Entamoeba*, *Giardia* or *Dientamoeba*.
24. A method for preventing and/or treating a disorder of a mucosal surface and/or symptoms thereof, comprising the step of administering an effective amount of a *Lactobacillus fermentum* variant according to claim 1 to 2, a component of a *Lactobacillus fermentum* variant according to claim 1 or 3, or a composition according to any one of claims 4 to 15, to a subject in need of such treatment.
25. A method according to claim 24, wherein said disorder is eczema, atopic dermatitis or rosacea.
26. Use of a *Lactobacillus fermentum* variant according to claim 1 or 2, a component of a *Lactobacillus fermentum* variant according to claim 1 or 3, or a composition according to any one of claims 4 to 15, for the manufacture of a medicament for the treatment and/or prevention of a gastrointestinal disorder, a disorder of a mucosal surface or symptoms thereof.
27. A method of stimulating IL-12 production in a subject, comprising the step of administering a *Lactobacillus fermentum* variant according to claim 1 to 2, a component of a *Lactobacillus fermentum* variant according to claim 1 or 3, or a composition according to any one of claims 4 to 15, to a subject in need of such treatment.
28. A method of up-regulating IFN- γ comprising the step of administering a *Lactobacillus fermentum* variant according to claim 1 to 2, a component of a *Lactobacillus fermentum* variant according to claim 1 or 3, or a composition according to any one of claims 4 to 15, to a subject in need of such treatment.
29. A method of inducing a Th 1-type response in a subject, comprising the step of administering a *Lactobacillus fermentum* variant according to claim 1 to 2, a component of a *Lactobacillus fermentum* variant according to claim 1 or 3, or a composition according to any one of claims 4 to 15, to a subject in need of such treatment.
30. A method of inhibiting the growth of a pathogen, comprising the step of administering a *Lactobacillus fermentum* variant according to claim 1 to 2, a component of a *Lactobacillus fermentum* variant according to claim 1 or 3, or a composition according to any one of claims 4 to 15, to a subject in need of such treatment.

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31. A method of modulating indigenous microbes of the gastrointestinal tract, comprising the step of administering a *Lactobacillus fermentum* variant according to claim 1 to 2, a component of a *Lactobacillus fermentum* variant according to claim 1 or 3, or a composition according to any one of claims 4 to 15, to a subject in need of such treatment.
32. Use of a *Lactobacillus fermentum* variant according to claim 1 or 2, a component of a *Lactobacillus fermentum* variant according to claim 1 or 3, or a composition according to any one of claims 4 to 15, for the manufacture of a medicament for stimulating IL-12 production, up-regulating IFN- γ , inducing a Th 1-type response, inhibiting the growth of a pathogen, or modulating indigenous microbes of the gastrointestinal tract, in a subject.

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